

**2018**

**CBCS**

**3rd Semester**

**ELECTRONICS**

**PAPER—C6T**

**(Honours)**

*Full Marks : 40*

*Time : 2 Hours*

*The figures in the right-hand margin indicate full marks.*

*Candidates are required to give their answers in their own words as far as practicable.*

*Illustrate the answers wherever necessary.*

**Electronic Circuits**

1. Answer any *five* questions : 5×2
- (a) Draw the piece-wise linear model of a diode. 2
- (b) What is thermal runaway? 2

- (c) What is ripple factor ? What are its values for a half-wave and a full-wave rectifier ? 2
- (d) What is the Barkhausen criteria of an oscillator ? 2
- (e) What is threshold voltage in an enhancement mode MOSFET ?
- (f) What is the difference between voltage and power amplifiers ? 2
- (g) What are the reasons for the shift of point of a transistor ? 2
- (h) Draw the circuit diagram of a CMOS inverter. 2

2. Answer any *four* questions : 4×5

- (a) What are the h-parameters? Find out the h-parameter equivalent circuit of a transistor in C.E. mode. [ $h_{re}$  and  $h_{oe}$  neglected] 2+3

- (b) Describe the potential divider method in details. How stabilisation of operating point is achieved by this method. 3+2
- (c) Define and explain the terms as applied to power amplifier.
- (i) collector efficiency
  - (ii) distortion 2½+2½
- (d) What are the characteristic parameters of JFET? Find the relation between them. 2+3
- (e) Explain the operation of depletion type MOSFET with suitable diagram. What is the difference between JFET and MOSFET? 4+1
- (f) (i) Compare between Common Base (CB), Common Emitter (CE) and Common Collector (CC) mode of operation.
- (ii) How Zener Diode regulator? 3+2
3. Answer any *one* question : 1×10
- (a) (i) State the advantages of negative feedback.

- (ii) Find the expression of gain with negative feedback.
- (iii) What is biasing? What are the different stability factors related to transistor biasing?

3+2+5

- (b) Draw the circuit of a single stage common source MOSFET amplifier. Draw its small signal low frequency equivalent circuit. Hence find an expression for voltage gain. Is the equivalent circuit used by you valid for high frequency operation? 2+2+4+2
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